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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/864,208	05/25/2001	Norio Kimura	2001_0660A	1632

513 7590 01/12/2007
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EXAMINER	
LUND, JEFFRIE ROBERT	
ART UNIT	PAPER NUMBER
1763	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/12/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No. 09/864,208	Applicant(s) KIMURA ET AL	
	Examiner Jeffrie R. Lund	Art Unit 1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 03 November 2006.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 14-16,18,20,23,25,27 and 41 is/are pending in the application.

4a) Of the above claim(s) 14 and 15 is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 16,18,20,23,25,27 and 41 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 08 January 2004 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 16, 23, and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oguri et al, US Patent 6,409,576 B1, in view of Laursen et al, US Patent 6,555,466, Hongo et al, US Patent 6,921,466 B2, and Lehman et al, US Patent 6,621,264 B1.

Oguri et al teaches a method of polishing a substrate that includes a processing apparatus and the steps of: moving the substrate from a load/unload portion 2 to the polishing section 30, including a polishing table 31, of the polishing apparatus; polishing the substrate; moving the substrate from the polishing section 30 to a cleaning machine 7, 8, 9; cleaning and drying the substrate; moving the substrate from the cleaning machine to a film thickness measuring device 70 disposed outside of the polishing section; measuring a film thickness of the substrate; and moving the substrate from the dried condition film thickness measuring device to the load/unload portion 2. If the film thickness of the substrate is not within an allowable range it is returned to the polishing section. (Figures 1 and 5; column 4 line 62 through column 5 line 37)

Oguri et al differs from the present invention in that it does not teach: a method of chemical mechanical planarization (polishing) of a first metal layer and a second metal

layer that includes the steps of: polishing the first metal layer by pressing and moving the first metal layer against a polishing surface with a first polishing fluid, the method of polishing the first metal layer comprising a first polishing process and a second polishing process, wherein a load on the substrate during said second polishing process is lower than a load during said first polishing process; detecting the end point of the first layer with an end point monitor disposed within a polishing table in the polishing section; rinsing (cleaning) the polishing surface using water; polishing the second metal layer by pressing and moving the second metal layer against the polishing surface with a second polishing fluid; and detecting the end point of the second metal layer using an optical film thickness monitor disposed within the polishing table; or storing the film thickness of the substrate.

Laursen et al teaches a method of chemical mechanical planarization (polishing) of a first metal layer 2 and a second metal layer 4 that includes the steps of: polishing the first metal layer by pressing and moving the first metal layer against a polishing surface with a first polishing fluid; detecting the end point; rinsing (cleaning) the polishing surface using water; polishing the second metal layer by pressing and moving the second metal layer against the polishing surface with a second polishing fluid; and measuring the second metal layer until it reaches a second end point. (Entire document, specifically, column 3 line 65 through column 4 line 17)

Hongo et al teaches a metal polishing method that includes: a first polishing process and a second polishing process, wherein a load on the substrate during said second polishing process is lower than a load during said first polishing process.

(Column 16 lines 9-25)

Lehman et al teaches that an eddy current monitor works well with thick films (i.e. the first film) and the optical film thickness monitor works better with thin films (column 13 lines 7-43), and that the thickness measurement can be stored for future reference. Lehman et al also teaches that the eddy current monitor and the optical film thickness monitor are disposed within the polishing table (Figure 5).

The motivation for adding the method of polishing a substrate with two metal layers of Laursen et al to the method of Oguri et al is to provide a specific polishing method as required by Oguri et al but only generically described, and to enable the apparatus of Oguri et al to process substrates having two metal layers.

The motivation for using a two-step etching method to etch a metal layer is to provide a more uniform surface and a better controlled polishing process as taught by Hongo et al.

The motivation for measuring the first end point with an eddy current monitor and the second end point with an optical film thickness monitor is to provide in-situ control and use the most accurate measurement system, as taught by Lehman et al, in measuring the end points when polishing substrates with two metal layers, as required by Laursen et al but only generically described.

The motivation for replacing the generic polishing table of Oguri et al with a polishing table Lehman et al having an eddy current monitor and optical thickness monitor within the polishing table is to provide a specific polishing table as required by Oguri et al but only generically described.

The motivation for storing the thickness data is to have the information on the specific wafer and to create a database to help control the processing method as taught by Lehman et al.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to polish a substrate having two metal layers using the method and apparatus of Oguri et al as taught by Laursen et al, use a two step metal polishing process as taught by Hongo et al, and to detect the end points of Oguri et al and Laursen et al with the eddy current monitor and optical film thickness monitor of Lehman et al; and store the thickness data as taught by Lehman et al.

Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

3. Claims 16, 23, and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oguri et al, US Patent 6,409,576 B1, in view of Laursen et al, US Patent 6,555,466, Hongo et al, US Patent 6,921,466 B2, Lehman et al, US Patent 6,621,264 B1, and Melvin et al, US Patent 6,984,168 B1.

Oguri et al teaches a method of polishing a substrate that includes a processing apparatus and the steps of: moving the substrate from a load/unload portion 2 to the polishing section 30, including a polishing table 31, of the polishing apparatus; polishing the substrate; moving the substrate from the polishing section 30 to a cleaning machine 7, 8, 9; cleaning and drying the substrate; moving the substrate from the cleaning machine to a film thickness measuring device 70 disposed outside of the polishing

section; measuring a film thickness of the substrate; and moving the substrate from the dried condition film thickness measuring device to the load/unload portion 2. If the film thickness of the substrate is not within an allowable range it is returned to the polishing section. (Figures 1 and 5; column 4 line 62 through column 5 line 37)

Oguri et al differs from the present invention in that it does not teach: a method of chemical mechanical planarization (polishing) of a first metal layer and a second metal layer that includes the steps of: polishing the first metal layer by pressing and moving the first metal layer against a polishing surface with a first polishing fluid, the method of polishing the first metal layer comprising a first polishing process and a second polishing process, wherein a load on the substrate during said second polishing process is lower than a load during said first polishing process; detecting the end point of the first layer with an end point monitor disposed within a polishing table in the polishing section; rinsing (cleaning) the polishing surface using water; polishing the second metal layer by pressing and moving the second metal layer against the polishing surface with a second polishing fluid; and detecting the end point of the second metal layer using an optical film thickness monitor disposed within the polishing table; or storing the film thickness of the substrate.

Laursen et al teaches a method of chemical mechanical planarization (polishing) of a first metal layer 2 and a second metal layer 4 that includes the steps of: polishing the first metal layer by pressing and moving the first metal layer against a polishing surface with a first polishing fluid; detecting the end point; rinsing (cleaning) the polishing surface using water; polishing the second metal layer by pressing and moving

the second metal layer against the polishing surface with a second polishing fluid; and measuring the second metal layer until it reaches a second end point. (Entire document, specifically, column 3 line 65 through column 4 line 17)

Hongo et al teaches a metal polishing method that includes: a first polishing process and a second polishing process, wherein a load on the substrate during said second polishing process is lower than a load during said first polishing process. (Column 16 lines 9-25)

Lehman et al teaches that an eddy current monitor works well with thick films (i.e. the first film) and the optical film thickness monitor works better with thin films (column 13 lines 7-43), and that the thickness measurement can be stored for future reference. Lehman et al also teaches that the eddy current monitor and the optical film thickness monitor are disposed within the polishing table (Figure 5).

Melvin et al teaches a CMP controller that uses in-situ measurement and post-thickness measurement to better control the CMP process and improve "run-to-run" control. (Figure 11; column 12 line 51 through column 13 line 17)

The motivation for adding the method of polishing a substrate with two metal layers of Laursen et al to the method of Oguri et al is to provide a specific polishing method as required by Oguri et al but only generically described, and to enable the apparatus of Oguri et al to process substrates having two metal layers.

The motivation for using a two-step etching method to etch a metal layer is to provide a more uniform surface and a better controlled polishing process as taught by Hongo et al.

The motivation for measuring the first end point with an eddy current monitor and the second end point with an optical film thickness monitor is to use the most accurate measurement system and to provide in-situ control, as taught by Lehman et al, in measuring the end points when polishing substrates with two metal layers, as required by Laursen et al but only generically described.

The motivation for replacing the generic polishing table of Oguri et al with a polishing table Lehman et al having an eddy current monitor and optical thickness monitor within the polishing table is to provide a specific polishing table as required by Oguri et al but only generically described.

The motivation for storing the thickness data is to have the information on the specific wafer and to create a database to help control the processing method as taught by Lehman et al.

Further motivation for using the endpoint monitors of Lehman et al in the apparatus of Oguri et al is to provide in-situ control as required by Laursen et al and to improve real-time control and run-to-run control by using both in-situ and in-line measurement as taught by Melvin et al.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to polish a substrate having two metal layers using the method and apparatus of Oguri et al as taught by Laursen et al, use a two step metal polishing process as taught by Hongo et al, and to detect the end points of Oguri et al and Laursen et al with the eddy current monitor and optical film thickness monitor of Lehman et al; and store the thickness data as taught by Lehman et al and Melvin et al.

Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

4. Claims 18, 20, 25, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oguri et al, US Patent 6,409,576 B1, Laursen et al, US Patent 6,555,466, Hongo et al, US Patent 6,921,466 B2, and Lehman et al, US Patent 6,621,264 B1; or Oguri et al, US Patent 6,409,576 B1, Laursen et al, US Patent 6,555,466, Hongo et al, US Patent 6,921,466 B2, Lehman et al, US Patent 6,621,264 B1, and Melvin et al, US Patent 6,984,168 B1, al as applied to claims 16, 23, and 41 above, and further in view of Hara et al, 6,451,696 B1.

Oguri et al, Laursen et al, Hongo et al, and Lehman et al; or Oguri et al, Laursen et al, Hongo et al, Lehman et al, and Melvin et al differ from the present invention in that they do not teach that the second metal layer of the substrate is pressed against the polishing surface by a load which is smaller than the load when polishing the first metal laver, the first and second polishing liquids have a PH at the same side of PH 7.

Hara et al teaches a polishing method that includes a first etching step having a load of 200 gf/cm^2 and a PH of 10.5, and a second etching step having a load of 100 gf/cm^2 and a PH of 10.5. (Column 12 lines 14-37)

The motivation for reducing the load and maintaining the PH of the slurry on the same side of PH 7 is to optimize the speed and quality of the polishing process as taught by Hara et al.

Therefore it would have been obvious to one of ordinary skill in the art at the time

the invention was made to optimize the load and maintain the PH of the slurry in the method of Oguri et al, Laursen et al, Hongo et al, and Lehman et al; or Oguri et al, Laursen et al, Hongo et al, Lehman et al, and Melvin et al as taught by Hara et al.

Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

5. Claims 16, 23, and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shinozuka et al, US Patent 6,315,858 B1, in view of Nishimura et al, US Patent 6,332,835 B1, Laursen et al, US Patent 6,555,466, Hongo et al, US Patent 6,921,466 B2, and Lehman et al, US Patent 6,621,264 B1.

Shinozuka et al teaches a method of polishing a substrate that includes a processing apparatus and the steps: moving the substrate from a load/unload portion 95 to the polishing section 10, including a polishing table, of the polishing apparatus; polishing the substrate; moving the substrate from the polishing section to a film thickness measuring device 80 disposed outside of the polishing section; measuring a film thickness of the substrate; recording the film thickness; moving the substrate to a gas polishing chamber; gas polishing the substrate; and moving the substrate from the dried condition film thickness measuring device to the load/unload portion 2. If the film thickness of the substrate is not within an allowable range it is returned to the polishing section. (Figure 1; column 4 lines 27-50; and column 5 line 36 through column 6 line 50)

Shinozuka et al differs from the present invention in that Shinozuka et al does not teach: a specific CMP processing apparatus that includes a cleaning machine to clean

and dry the substrate with the method steps of moving the substrate from the polishing section to a cleaning machine or cleaning and drying the substrate; or the method of chemical mechanical planarization (polishing) of a first metal layer and a second metal layer that includes the steps of: polishing the first metal layer by pressing and moving the first metal layer against a polishing surface with a first polishing fluid, the method of polishing the first metal layer comprising a first polishing process and a second polishing process, wherein a load on the substrate during said second polishing process is lower than a load during said first polishing process; detecting the end point of the first layer with an end point monitor disposed within a polishing table in the polishing section; rinsing (cleaning) the polishing surface using water; polishing the second metal layer by pressing and moving the second metal layer against the polishing surface with a second polishing fluid; and detecting the end point of the second metal layer using an optical film thickness monitor disposed within the polishing table.

Nishimura et al teaches a CMP processing apparatus 1 that includes: a load/unload portion 21; a polishing section 2 including a polishing table 6; and a cleaning machine 31, 32, 33. Nishimura et al also teaches a method of polishing a substrate that includes loading from the load/unload section to a polishing section; polishing the substrate; moving the polished substrate from the polishing section to the cleaning machine; cleaning and drying the substrate; and moving the dried substrate to the unload portion. (Figure 8; column 8 line 19 through column 9 line 2)

Laursen et al teaches a method of chemical mechanical planarization (polishing) of a first metal layer 2 and a second metal layer 4 that includes the steps of: polishing

the first metal layer by pressing and moving the first metal layer against a polishing surface with a first polishing fluid; detecting the end point; rinsing (cleaning) the polishing surface using water; polishing the second metal layer by pressing and moving the second metal layer against the polishing surface with a second polishing fluid; and measuring the second metal layer until it reaches a second end point. (Entire document, specifically, column 3 line 65 through column 4 line 17)

Hongo et al teaches a metal polishing method that includes: a first polishing process and a second polishing process, wherein a load on the substrate during said second polishing process is lower than a load during said first polishing process. (Column 16 lines 9-25)

Lehman et al teaches that an eddy current monitor works well with thick films (i.e. the first film) and the optical film thickness monitor works better with thin films (column 13 lines 7-43), and that the thickness measurement can be stored for future reference. Lehman et al also teaches that the eddy current monitor and the optical film thickness.

The motivation for replacing the generic CMP processor of Shinozuka et al with the CMP processor of Nishimura et al is to provide a specific processing system as required by Shinozuka et al.

The motivation for adding the steps of moving the substrate from the polishing chamber to the cleaning chamber, and cleaning and drying the substrate to the method of Shinozuka et al is to provide required processing steps in a CMP process that is required by Shinozuka et al but generically described; and to clean and dry the substrate after polishing to remove the slurry and other polishing by-products to prevent

damage to the substrate and to prepare the wafer for the next processing step as taught by Nishimura et al.

The motivation for adding the method of polishing a substrate with two metal layers of Laursen et al to the method of Shinozuka et al is to provide a specific polishing method as required by Shinozuka et al but only generically described, and to enable the apparatus of Shinozuka et al to process substrates having two metal layers.

The motivation for using a two-step etching method to etch a metal layer is to provide a more uniform surface and a better controlled polishing process as taught by Hongo et al.

The motivation for measuring the first end point with an eddy current monitor and the second end point with an optical film thickness monitor is to use the most accurate measurement system and to provide in-situ control, as taught by Lehman et al, in measuring the end points when polishing substrates with two metal layers, as required by Laursen et al but only generically described.

The motivation for replacing the generic polishing table of Shinozuka et al and Nishimura et al with the polishing table Lehman et al having an eddy current monitor and optical thickness monitor within the polishing table is to provide a specific polishing table as required by Shinozuka et al and Nishimura et al but only generically described, and to provide the required endpoint detection as taught by Laursen et al and Lehman et al.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the generic CMP processing apparatus of Shinozuka

et al with the CMP processing apparatus of Nishimura et al; and polish a substrate having two metal layers as taught by Laursen et al, use a two step metal polishing process as taught by Hongo et al, to detect the end points of polishing process with the eddy current monitor and optical film thickness monitor of Lehman et al; and clean and dry the substrate as taught by Nishimura et al.

Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

6. Claims 16, 23, and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shinozuka et al, US Patent 6,315,858 B1, in view of Nishimura et al, US Patent 6,332,835 B1, Laursen et al, US Patent 6,555,466, Hongo et al, US Patent 6,921,466 B2, Lehman et al, US Patent 6,621,264 B1, and Melvin et al, US Patent 6,984,168 B1.

Shinozuka et al teaches a method of polishing a substrate that includes a processing apparatus and the steps: moving the substrate from a load/unload portion 95 to the polishing section 10, including a polishing table, of the polishing apparatus; polishing the substrate; moving the substrate from the polishing section to a film thickness measuring device 80 disposed outside of the polishing section; measuring a film thickness of the substrate; recording the film thickness; moving the substrate to a gas polishing chamber; gas polishing the substrate; and moving the substrate from the dried condition film thickness measuring device to the load/unload portion 2. If the film thickness of the substrate is not within an allowable range it is returned to the polishing

section. (Figure 1; column 4 lines 27-50; and column 5 line 36 through column 6 line 50)

Shinozuka et al differs from the present invention in that Shinozuka et al does not teach: a specific CMP processing apparatus that includes a cleaning machine to clean and dry the substrate with the method steps of moving the substrate from the polishing section to a cleaning machine or cleaning and drying the substrate; or the method of chemical mechanical planarization (polishing) of a first metal layer and a second metal layer that includes the steps of: polishing the first metal layer by pressing and moving the first metal layer against a polishing surface with a first polishing fluid, the method of polishing the first metal layer comprising a first polishing process and a second polishing process, wherein a load on the substrate during said second polishing process is lower than a load during said first polishing process; detecting the end point of the first layer with an end point monitor disposed within a polishing table in the polishing section; rinsing (cleaning) the polishing surface using water; polishing the second metal layer by pressing and moving the second metal layer against the polishing surface with a second polishing fluid; and detecting the end point of the second metal layer using an optical film thickness monitor disposed within the polishing table.

Nishimura et al teaches a CMP processing apparatus 1 that includes: a load/unload portion 21; a polishing section 2 including a polishing table 6; and a cleaning machine 31, 32, 33. Nishimura et al also teaches a method of polishing a substrate that includes loading from the load/unload section to a polishing section; polishing the substrate; moving the polished substrate from the polishing section to the cleaning machine; cleaning and drying the substrate; and moving the dried substrate to

the unload portion. (Figure 8; column 8 line 19 through column 9 line 2)

Laursen et al teaches a method of chemical mechanical planarization (polishing) of a first metal layer 2 and a second metal layer 4 that includes the steps of: polishing the first metal layer by pressing and moving the first metal layer against a polishing surface with a first polishing fluid; detecting the end point; rinsing (cleaning) the polishing surface using water; polishing the second metal layer by pressing and moving the second metal layer against the polishing surface with a second polishing fluid; and measuring the second metal layer until it reaches a second end point. (Entire document, specifically, column 3 line 65 through column 4 line 17)

Hongo et al teaches a metal polishing method that includes: a first polishing process and a second polishing process, wherein a load on the substrate during said second polishing process is lower than a load during said first polishing process. (Column 16 lines 9-25)

Lehman et al teaches that an eddy current monitor works well with thick films (i.e. the first film) and the optical film thickness monitor works better with thin films (column 13 lines 7-43), and that the thickness measurement can be stored for future reference. Lehman et al also teaches that the eddy current monitor and the optical film thickness.

Melvin et al teaches a CMP controller that uses in-situ measurement and post-thickness measurement to better control the CMP process and improve "run-to-run" control. (Figure 11; column 12 line 51 through column 13 line 17)

The motivation for replacing the generic CMP processor of Shinozuka et al with the CMP processor of Nishimura et al is to provide a specific processing system as

required by Shinozuka et al.

The motivation for adding the steps of moving the substrate from the polishing chamber to the cleaning chamber, and cleaning and drying the substrate to the method of Shinozuka et al is to provide required processing steps in a CMP process that is required by Shinozuka et al but generically described; and to clean and dry the substrate after polishing to remove the slurry and other polishing by-products to prevent damage to the substrate and to prepare the wafer for the next processing step as taught by Nishimura et al.

The motivation for adding the method of polishing a substrate with two metal layers of Laursen et al to the method of Shinozuka et al is to provide a specific polishing method as required by Shinozuka et al but only generically described, and to enable the apparatus of Shinozuka et al to process substrates having two metal layers.

The motivation for using a two-step etching method to etch a metal layer is to provide a more uniform surface and a better controlled polishing process as taught by Hongo et al.

The motivation for measuring the first end point with an eddy current monitor and the second end point with an optical film thickness monitor is to use the most accurate measurement system and to provide in-situ control, as taught by Lehman et al, in measuring the end points when polishing substrates with two metal layers, as required by Laursen et al but only generically described.

The motivation for replacing the generic polishing table of Shinozuka et al and Nishimura et al with the polishing table Lehman et al having an eddy current monitor

and optical thickness monitor within the polishing table is to provide a specific polishing table as required by Shinozuka et al and Nishimura et al but only generically described, and to provide the required endpoint detection as taught by Laursen et al and Lehman et al.

Further motivation for using the endpoint monitors of Lehman et al in the apparatus of Shinozuka et al is to provide in-situ control as required by Laursen et al and to improve real-time control and run-to-run control by using both in-situ and in-line measurement as taught by Melvin et al.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the generic CMP processing apparatus of Shinozuka et al with the CMP processing apparatus of Nishimura et al; and polish a substrate having two metal layers as taught by Laursen et al, use a two step metal polishing process as taught by Hongo et al, to detect the end points of polishing process with the eddy current monitor and optical film thickness monitor of Lehman et al; clean and dry the substrate as taught by Nishimura et al; and to use both in-situ and inline measurement as taught by Melvin et al.

Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

7. Claims 18, 20, 25, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shinozuka et al, US Patent 6,315,858 B1, Nishimura et al, US Patent 6,332,835 B1, Laursen et al, US Patent 6,555,466, Hongo et al, US Patent 6,921,466

B2, and Lehman et al, US Patent 6,621,264 B1; or Shinozuka et al, US Patent 6,315,858 B1, Nishimura et al, US Patent 6,332,835 B1, Laursen et al, US Patent 6,555,466, Hongo et al, US Patent 6,921,466 B2, Lehman et al, US Patent 6,621,264 B1, and Melvin et al, US Patent 6,984,168 B1 as applied to claims 16, 23, and 41 above, and further in view of Hara et al, 6,451,696 B1.

Shinozuka et al, Nishimura et al, Laursen et al, Hongo et al, and Lehman et al; or Shinozuka et al, Nishimura et al, Laursen et al, Hongo et al, Lehman et al, and Melvin et al differ from the present invention in that they do not teach that the second metal layer of the substrate is pressed against the polishing surface by a load which is smaller than the load when polishing the first metal laver, the first and second polishing liquids have a PH at the same side of PH 7.

Hara et al teaches a polishing method that includes a first etching step having a load of 200 gf/cm^2 and a PH of 10.5, and a second etching step having a load of 100 gf/cm^2 and a PH of 10.5. (Column 12 lines 14-37)

The motivation for reducing the load and maintaining the PH of the slurry on the same side of PH 7 is to optimize the speed and quality of the polishing process as taught by Hara et al.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the load and maintain the PH of the slurry in the method of Shinozuka et al, Nishimura et al, Laursen et al, Hongo et al, and Lehman et al; or Shinozuka et al, Nishimura et al, Laursen et al, Hongo et al, Lehman et al, and Melvin et al as taught by Hara et al.

Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

Response to Arguments

8. Applicant's arguments with respect to claims 16, 18, 20, 23, 25, 27, and 41 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrie R. Lund whose telephone number is (571) 272-1437. The examiner can normally be reached on Monday-Thursday (6:30 am-6:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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Primary Examiner